Moreover, in the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned Applicant at the phone numbers provided above.

IN THE CLAIMS:

Please cancel Claims 139, 189, 246 and 250 without prejudice or disclaimer.

Please amend claim 85 as follows:

85. (Thrice Amended) A method for locating a terrestrial mobile station, MS, when there is an occurrence of at least one of (A) and (B) following: (A) said terrestrial mobile station MS being tracked, and (B) a request for locating said terrestrial mobile station MS; wherein said method uses wireless signal measurements obtained from transmissions between said terrestrial mobile station MS and a plurality of terrestrial communication stations, each capable of at least one of: wirelessly detecting said terrestrial mobile station MS, and wirelessly being detected by said terrestrial mobile station MS, comprising:

providing access to first and second mobile station location estimators, wherein said location estimators provide likely geographical ranges of an unknown location of said mobile station MS when said location estimators are supplied with corresponding input data obtained using wireless signal measurements obtained by transmissions between said mobile station MS and the communication stations;

wherein said first location estimator performs one or more of the following techniques (a) through (d) when supplied with said corresponding input data:

(a) an angulation technique for determining, for at least one of the communication stations, CS, at least one of (i) and (ii) following: (i) a distance between the communication station CS and the mobile station MS, said distance dependent upon signal time delay derived information, and (ii) a wireless signal angle of arrival between the mobile station MS and the communication station CS, wherein said at least one communication station CS is stationary;

(b) a learning technique, wherein said learning technique uses a learned association for associating (b1) and (b2) following:

(b1) information obtained from at least one of signal strength and signal time delay measurements of wireless signal communicated between the mobile station MS and the communication stations, and

(b2) data identifying a likely geographical range for a location for the mobile station MS,

wherein said association is learned by a training process using a plurality of data pairs, each said data pair including: first information identifying a known location of some mobile station, and second information from wireless signal measurements communicated between said some mobile station and one or more of the communication stations when said some mobile station is at the known location;

(c) a stochastic technique, wherein said stochastic technique uses a statistical correlation for correlating (c1) and (c2) following:

(c1) information obtained from at least one of signal strength and signal time delay measurements of wireless signal between the mobile station MS and the communication stations, and

(c2) data identifying a likely geographical range for a location for the mobile station MS,

wherein said correlation is used for determining a probability that the mobile station MS is within the likely geographical range of (c2);

(d) a multipath resolution technique for determining a likely geographical range L for a location of the mobile station MS, wherein for determining L, (d1) - (d3) following hold:

(d1) the multipath resolution technique is dependent upon multipath data, wherein the multipath data is obtained from wireless signal multipath information communicated between the mobile station MS and the communication stations,

(d2) the multipath resolution technique is dependent upon (i) and (ii) following: (i) a representation of each of a plurality of geographical locations and (ii) for each of the geographical locations, corresponding multipath information previously obtained using transmissions between some mobile station and the communication stations, when the some mobile station transmitted from approximately the geographical location,

(d3) the multipath resolution technique selects one or more of the geographical location representations that are likely to be approximate to the unknown location;

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first receiving, from said first location estimator, in response to said first location estimator obtaining a first instance of its said corresponding input data for said at least one occurrence, first location related information having at least a first likely geographical range for a location of the mobile station MS;

second receiving, from said second location estimator, in response to said second location estimator obtaining a second instance of its said corresponding input data for said at least one occurrence, second location related information having at least a second likely geographical range for the location of the mobile station MS;

wherein each of said first and second likely geographical ranges is determined in a manner that is substantially unaffected by the likely geographical range of the other of said first and second location estimators;

determining a resulting location estimate of the mobile station MS that is dependent upon at least one of: (a) and (b) following: (a) a first value obtained from said first location related information, and (b) a second value obtained from said second location related information.

Please amend claim 86 as follows:

2 ~~86~~ (Twice Amended) The method as claimed in Claim ~~85~~ 1, further including:

first supplying said first location estimator with said first instance; and

second supplying said second location estimator with said second instance;

wherein for at least one of said four steps of first and second supplying, and, first and second receiving uses a transmission on the Internet.

3 ~~87~~. The method as claimed in Claim ~~85~~ 1, further including a step of receiving said wireless signal measurements during a wireless communication between said mobile station MS and said plurality of communication stations for contacting an emergency response center.

4 ~~88~~. The method as claimed in Claim ~~85~~ 1, wherein said step of providing access includes transmitting, through a telecommunications network, said first location estimator from a source site to an activation site for generating said first likely geographical range.

5 ~~89~~. The method as claimed in Claim ~~88~~ 4, wherein said step of transmitting includes sending an encoding of said first location estimator via the Internet.

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Please amend claim 90 as follows:

90. (Twice Amended) The method as claimed in Claim 85, further including a step of retrieving at least one of (d) and (e) following:

(d) first historical location data including (i) and (ii) following:

(i) a first set of likely geographical ranges for one or more mobile station locations, said geographical ranges of said first set are generated by a location estimator LE_1 providing a plurality of first outputs wherein each of said first outputs includes at least one geographic value that is substantially effectively equivalent to a value of a corresponding output of said first location estimator, wherein LE_1 uses first data obtained from wireless signal measurements of transmissions between (1) and (2) following: (1) one or more of a plurality of mobile stations, at a first plurality of locations, and (2) said plurality of communication stations;

wherein said first set is selected by determining that a distance related value between at least one of said likely geographical ranges of said first set, and said first likely geographical range for the location of the mobile station MS has a predetermined relationship; and

(ii)data identifying said locations of said first plurality of locations; and

(e) second historical location data including (iii) and (iv) following:

(iii) a second set of likely geographical ranges for one or more mobile station locations, said geographical ranges of said second set are generated by a location estimator LE_2 providing a plurality of second outputs wherein each of said second outputs includes at least one geographical value that is substantially effectively equivalent to a value of a corresponding output of said second location estimator, wherein LE_2 uses second data obtained from wireless signal measurements of transmissions between (3) and (4) following: (3) one or more mobile stations, at a second plurality of locations, and (4) said plurality of communication stations;

wherein said second set is selected by determining that a distance related value between at least one of said previous likely geographical ranges for one or more mobile station locations of said second set, and said

second likely geographical range for the location of the mobile station MS is less than a second predetermined value, and

(iv) data identifying said locations of said second plurality of locations.

Please amend claim 91 as follows:

91. (Twice Amended) The method as claimed in Claim 85, further including, for at least one likely geographical range of said first and second likely geographical ranges, a step of obtaining a likelihood value that the at least one likely geographical range of said mobile station MS includes said mobile station MS, wherein said likelihood value is obtained using previous likely geographical ranges for one or more mobile station locations generated by a location estimator LE providing a plurality of outputs wherein each of said outputs includes at least one geographical value that is substantially effectively equivalent to a value of a corresponding output of the location estimator that generated said at least one likely geographical range.

92. The method as claimed in Claim 85, wherein said step of providing access includes providing a third mobile station location estimator, wherein said third mobile station location estimator generates a likely geographical range of where said mobile station MS is unlikely to be located.

93. The method as claimed in Claim 85, wherein said wireless signal measurements are measurements of transmissions between said mobile station MS and said plurality of communication stations, wherein for providing a single instance of said corresponding input data to one of said location estimators, said transmissions occur within an interval of time that is less than a predetermined duration.

Please amend claim 94 as follows:

94. (Twice Amended) The method as claimed in Claim 85, further including performing a first simulation for predicting a likelihood of said mobile station MS being in said first likely geographical range, wherein said simulation uses pairs of location representations, wherein for each pair, a first member of the pair includes a likely geographical range obtained from a location estimator LE providing an output wherein said output includes at least one geographical value that is substantially effectively equivalent to a value of a corresponding output of said first location estimator for locating a different mobile station, and a second member of the

pair including a representation of an independently determined location of the different mobile station.

Please amend claim 95 as follows:

11 ~~95~~. (Amended) The method as claimed in Claim ~~85~~ 1, wherein at least one of said first and second location estimators utilize one of the following:

(a) a pattern recognition location technique for estimating a location of said mobile station MS by recognizing a pattern of characteristics of said corresponding input data obtained from multiple transmission paths of the transmissions between said mobile station MS and at least one of the communication stations;

(b) a mobile base station estimator for estimating a location of said mobile station MS from location information received from a mobile base station detecting wireless transmissions of said mobile station MS;

(c) a coverage area location technique for estimating a location of said mobile station MS by determining a common area of wireless coverage areas for different sets of one or more of said communication stations;

(d) a negative logic location technique for estimating where said mobile station MS is unlikely to be located.

12 ~~96~~. The method as claimed in Claim ~~85~~ 1, wherein at least one of the following (a) through (c) holds:

(a) for said learning technique, said association is provided, at least in part, by an artificial neural network for recognizing a pattern of characteristics of location information obtained from said wireless signal measurements;

(b) said angulation technique provides the distances between the mobile station MS and said at least one communication station using one or more of: a wireless signal time of arrival, a wireless signal time difference of arrival, and a wireless signal strength indication; and

(c) said stochastic technique provides said statistical correlation using one of: principle decomposition, least squares, partial least squares, and Bollenger Bands.

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Please amend claim 97 as follows:

97. (Twice Amended) A method for estimating, for each mobile station MS of a plurality of mobile stations, an unknown terrestrial location, L, for MS using wireless signal measurements obtained from transmissions between said mobile station MS and a plurality of fixed location terrestrial communication stations, wherein each of said communications stations is substantially co-located with one or more of a transmitter and a receiver for wirelessly communicating with said mobile station MS, comprising:

initiating one or more requests for information related to the location of said mobile station MS with one or more mobile station location evaluators such that when said location evaluators are supplied with corresponding input data having values obtained using wireless signal measurements obtained via transmissions between said mobile station MS substantially at L, and the communication stations, said one or more location evaluators perform at least two of the following techniques (i), (ii) and (iii):

(i) a first technique for estimating where said mobile station MS is located using signal time delay values obtained from signals received at the mobile station MS from one or more satellites, wherein said first technique uses said signal time delay values for determining one or more distances between said mobile station MS and said one or more satellites;

(ii) a second technique for recognizing multipath characteristics, wherein said second technique includes the steps of (a) and (b) following:

(a) calibrating, for each location L_a of a plurality of geographical locations, (a1) and (a2) following: (a1) a representation of the geographical location L_a, and (a2) for the geographical location L_a, corresponding multipath information indicative of multipath signals previously transmitted between some mobile station and the communication stations, when the some mobile station transmitted from approximately the geographical location L_a;

(b) determining one or more likely location estimates for MS by identifying a similarity between (b1) and (b2) following: (b1) multipath characteristics determined from wireless signals communicated between the mobile station MS and the communication stations, and (b2) the multipath information of (a2) for a collection of one or more of the geographical locations; and

(iii) a third technique, wherein said third technique uses a statistical correlation for correlating (c) and (d) following:

(c) values that are a function of at least one of: a signal strength and a signal time delay of wireless signals between said mobile station MS and the communication stations, and

(d) information indicative of: a plurality of collections of wireless signal measurements, wherein for each said collection, there is a known location S where said collection is obtained from transmissions between said communication stations and some mobile station at the location S;

wherein said correlation is used for determining that the mobile station MS is within a corresponding geographic area;

obtaining a first collection of one or more location estimates of said mobile station MS, from said one or more location evaluators using said corresponding input data;

wherein said step of obtaining requires two way communication between the mobile station MS and at least one of the communication stations prior to performing any of said first, second and third techniques;

transmitting, to a predetermined destination via a communications network, resulting information related to the location L of said mobile station MS, wherein said resulting information is dependent on at least said first collection of location estimates.

Please amend claim 98 as follows:

14 98 (Twice Amended) The method of Claim 97, further including the following steps:

second obtaining, from a second set of said one or more location evaluators, a second collection of one or more location estimates using values obtained from wireless signal measurements for a time different from a time of the transmissions between the mobile station MS and the communication stations for supplying said corresponding input data;

determining, as part of said resulting information, a resulting location estimate of the mobile station MS, wherein said resulting location estimate is dependent upon: (a) a first value obtained from said first collection of location estimates, and (b) a second value obtained from said second collection of location estimates.

Please amend claim 99 as follows:

15 99. (Thrice Amended) A method for locating mobile stations at one or more unknown terrestrial locations using wireless signal measurements obtained from transmissions between said

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mobile stations and a plurality of fixed location terrestrial communication stations, wherein each of said communications stations includes one or more of a transmitter and a receiver for wirelessly communicating with said mobile stations using one of the following wireless transmission techniques: CDMA, TDMA, GSM, AMPS, and NAMPS, comprising:

providing a plurality of requests for location information, each request related to a location of one of said mobile stations, to one or more mobile station location estimators such that when said location estimators are supplied with input data having values obtained from wireless signal measurements obtained via transmissions between said mobile stations and the communication stations, said one or more location estimators perform at least two of the following techniques (i), (ii), (iii) and (iv):

(i) a first technique for estimating locations of said mobile stations, wherein for each mobile station MS1 of at least some of the mobile stations, the first technique estimates a location of MS1 using signal time delay values from a first corresponding portion of said input data obtained from signals received at the mobile station MS1 from one or more satellites, wherein said first technique uses said signal time delay values for determining one or more distances between said mobile station MS1 and said one or more satellites;

(ii) a second technique for recognizing a pattern of characteristics of a second corresponding portion of said input data, wherein said second technique uses an association for associating, for each location L of a plurality of mobile station locations, multipath wireless signal characteristics between: (a) one or more of the communication stations, and (b) one of the mobile stations at the location L; and

(iii) a third technique for determining locations of said mobile stations, wherein for each mobile station MS3 of at least some of the mobile stations, and for at least a corresponding one of the communication stations CS that is responsive to transmissions from the mobile station MS3, one of (a) and (b) following is determined at a site remote from the mobile station MS3:

(a) a distance between the communication station CS and the mobile station MS3, said distance dependent upon measurements of a time delay of signals transmitted between the mobile station MS3 and the communication station CS, said measurements of a time delay obtained from a third corresponding portion of said input data, and

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(b) a wireless signal angle of arrival indicative of an angular orientation about the communication station CS of a direction of the wireless transmissions to CS from MS3;

(iv) a fourth technique for determining likely locations of the mobile stations, wherein for each mobile station MS4 of at least some of the mobile stations, (c) - (e) following hold:

(c) the fourth technique is dependent upon multipath data of a fourth corresponding portion of said input data, wherein the multipath data is obtained from wireless signal multipath information communicated between the mobile station MS4 and the communication stations,

(d) the fourth technique is dependent upon (d1) and (d2) following: (d1) a representation of each of a plurality of geographical locations, and (d2) for each location, L_d, of the geographical locations, corresponding multipath information previously obtained using transmissions between some one of the mobile stations and the communication stations, when the some one mobile station transmitted from approximately the geographical location L_d,

(e) the fourth technique determines one or more of the geographical location representations that are likely to be approximate to at least one unknown location of the mobile station MS4;

first obtaining, in response to one of the requests, at least a first location estimate of a first of said mobile stations, said first location estimate obtained from said one or more location estimators performing a first collection of one or more of said first, second, third and fourth techniques using an available instance of said corresponding portions of said input data for the first mobile station at a first unknown location;

second obtaining, in response to another of the requests, at least a second location estimate of a second of said mobile stations, said second location estimate obtained from said one or more location estimators by performing a second collection, different from said first collection, of one or more of said first, second and third techniques when there is an available instance of their said corresponding portions of said input data for the second mobile station at a second unknown location;

first transmitting, to a first destination via a first communications network, first resulting information related to the location of said first mobile station wherein said first resulting information is obtained using said first location estimate;

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second transmitting to a second destination via a second communications network, second resulting information related to the location of said second mobile station, wherein said second resulting information is obtained using said second location estimate.

Please amend claim 100 as follows:

100. (Twice Amended) A location system for determining a location of a mobile station MS, wherein said mobile station is one of a plurality of mobile stations, and signal measurements are available of wireless transmissions between the plurality of mobile stations and a plurality of terrestrial communication stations, comprising:

one or more location estimators, each said location estimator for estimating a likely geographical location for each of one or more individual mobile stations of the plurality of mobile stations when said location estimator is supplied with data obtained from a set of said wireless signal measurements provided by wireless transmissions between the individual mobile station and at least one of said plurality of communication stations;

an archive for storing a plurality of data item collections, wherein for each geographical location of a plurality of geographical locations, there is one of said data item collections having (a1) and (a2) following:

(a1) a representation of the geographical location, and

(a2) data obtained from wireless signal measurements provided by one of the plurality of mobile stations transmitting from approximately the geographical location of (a1);

a performance evaluator for determining, for at least one of said location estimators, ESTR, a corresponding one or more performance measurements indicative of a previous performance of said one location estimator ESTR in locating one or more of the plurality of mobile stations, wherein said corresponding performance measurements are determined using said data item collections;

a controller for activating a group of at least one of said location estimators, having ESTR therein, wherein (b1) and (b2) following occur:

(b1) ESTR outputs a corresponding likely geographical location LE of an unknown location of said mobile station MS when ESTR is activated with a first said set of wireless signal measurements provided by wireless transmissions between said mobile station MS and at least one of said plurality of communication stations, and

(b2) the likely geographical location LE has a corresponding likelihood value indicating a likelihood of said mobile station MS being at a location represented by LE, wherein said one or more corresponding performance measurements for said one location estimator ESTR are used in determining said corresponding likelihood value;

a location determiner for determining resulting location information for said mobile station MS, wherein said location determiner uses LE to obtain the resulting location information.

Please amend claim 101 as follows:

17 ~~101~~. (Twice Amended) A method for determining a location of a mobile station, MS, wherein said mobile station MS is one of a plurality of mobile stations, and signal measurements are capable of being obtained by wireless transmissions between the plurality mobile stations and a plurality of fixed location communication stations, each of said communication stations capable of at least one of: wirelessly detecting said mobile station MS, and wirelessly being detected by said mobile station MS, comprising:

providing access to a first instance of a mobile station location estimator for estimating, for each of one or more of said mobile stations, a location of the mobile station when said first instance is supplied with corresponding input data obtained using said signal measurements obtained by wireless transmissions between the mobile station and said plurality of communication stations;

storing a plurality of data collections, wherein for each of a plurality of geographical locations, there is one of said data collections having (a1) and (a2) following:

(a1) a representation of the geographical location, and

(a2) a representation of said signal measurements between one of the mobile stations and the plurality of communication stations when said one mobile station is approximately at the geographical location of (a1);

obtaining, from said signal measurements between said mobile station MS and said plurality of communication stations, an initial location estimate of said mobile station MS from said first instance;

additionally obtaining one or more additional location estimates, wherein said additional location estimates are output by a second instance of said location estimator when said second instance is supplied with input from at least one of said representations of signal measurements of (a2) for at least one of said data collections, wherein for each occurrence of at least a majority of

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occurrences of locating the mobile stations, said first and second instances output location estimates that are approximately the same;

deriving a further location estimate of said mobile station MS using a group of one or more of said geographical location representations of (a1) for said data collections whose representations of signal measurements of (a2) were used to generate one of said additional location estimates.

18 ~~102~~. The method as claimed in Claim ~~101~~ 17, wherein said step of deriving includes determining an area boundary of said further location estimate as a function of said geographical location representations in said group.

Please amend claim 103 as follows:

19 ~~103~~. (Twice Amended) A location system for locating a mobile station MS using wireless signal measurements obtained from transmissions between said mobile station MS and a network of transceivers, wherein said transceivers are cooperatively linked for use in locating the mobile stations, comprising:

a communications interface for routing, to each of one or more location estimators, corresponding input data for estimating one or more initial locations of said mobile station MS, wherein said corresponding input data is obtained using measurements of wireless signals obtained by transmissions between (i) and (ii) following:

(i) the mobile station MS, at a corresponding geographical location, and

(ii) the network of transceivers;

a location estimate adjuster for deriving an additional location estimate of said mobile station MS using a first initial location estimate generated by a first of said location estimators, wherein said additional location estimate is determined using one or more other location estimates generated by one of said location estimators, wherein said other location estimates are within a predetermined area about said first initial location estimate, and said additional location estimate is determined using known locations corresponding to said other location estimates; and

an output gateway for transmitting, to a predetermined destination, a resulting location estimate that is dependent upon one or more of said first initial location estimate and said additional location estimate.

20 105. The location system, as claimed in Claim 19, further including a most likely estimator for determining said resulting location estimate of the corresponding geographical location of the mobile station MS, said resulting location estimate being derived using said additional location estimate and its corresponding confidence value, said most likely estimator includes a probability density function for fuzzifying at least said confidence value for said additional location estimate over an area adjacent a boundary of said additional location estimate.

Please amend claim 106 as follows:

21 106. (Twice Amended) A location system for locating mobile stations using wireless signal data obtained from transmissions between said mobile stations and a network of fixed location communication stations, wherein said communication stations are cooperatively linked for use in locating said mobile stations, comprising:

an archive for storing a plurality of data collections, wherein for each of a plurality geographical locations, there is one of said data collections having (a1) and (a2) following:

(a1) a representation of the geographical location,

(a2) a set of said wireless signal data obtained using transmissions between one of said mobile stations and the network, wherein the one mobile station transmits from approximately the geographical location of (a1);

a plurality of location estimators, one or more of which are adaptable, wherein each said adaptable location estimator generates geographical location estimates for said mobile stations, wherein for each said adaptable location estimator, there is a corresponding group of wireless signal measurement parameters, wherein for said adaptable location estimator to generate a location estimate of an individual one of said mobile stations, at least some of said parameters must be instantiated with values obtained from transmissions between said individual mobile station and one or more of the communication stations, and wherein each said adaptable location estimator adapts its generated geographical location estimates according to changes in said data collections of said archive;

a location estimator selector for selecting one or more of said plurality of location estimators for generating mobile station location estimates;

wherein for locating one of said mobile stations, MS, said location estimator selector selects one or more of said adaptable location estimators according to whether said at least some of said parameters from said corresponding group of parameters for the adaptable location estimator are able to be instantiated using wireless signal measurements obtained from transmissions between said mobile station MS and the communication stations.

Please amend claim 107 as follows:

107.(Amended) The location system of Claim 106, further including a combiner location estimator for determining a resulting location estimate of said mobile station MS by combining a plurality of location estimates from the selected one or more location estimators.

110. The location system as claimed in Claim 107, wherein at least a first of said adaptable location estimators includes a first artificial neural network, and said first artificial neural network is one of: a multilayer perceptron, an adaptive resonance theory model, and radial basis function network.

Please amend claim 111 as follows:

111. (Thrice Amended) The location system as claimed in Claim 106, wherein for one or more of the location estimators used for determining a location estimate of the mobile station, MS, there is at least one of the location estimators LE that has a parameter for receiving a value dependent upon wireless transmissions between said mobile station MS and one of said communication stations CS, wherein said value is indicative of at least one of the following conditions (a) through (e):

(a) CS is active for wireless communication with said mobile station MS and a pilot signal by CS is detected by said mobile station MS;

(b) CS is active for wireless communication with said mobile station MS and CS detects wireless transmissions by said mobile station MS;

(c) CS is active for wireless communication with said mobile station MS and CS does not detect wireless transmissions by said mobile station MS;

(d) CS is active for wireless communication with said mobile station MS and said mobile station MS does not detect wireless transmissions by CS; and

(e) CS is not active for wireless communication with said mobile station MS.

Please amend claim 112 as follows:

112.(Amended) A location system for receiving wireless signal measurements of wireless signals transmitted between a plurality of mobile stations and a network of transceivers, wherein said transceivers in the network are cooperatively linked for use in locating the mobile stations, comprising:

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a mobile station location providing means for providing location estimates of said mobile stations, such that when said providing means is supplied with said measurements of wireless signals transmitted between a particular one of the mobile stations and said network, said providing means provides a first collection of one or more location estimates for said particular mobile station;

an expert system for activating expert system rules for one of: (a) modifying one of said location estimates of said first collection, and (b) obtaining one or more additional location estimates of the particular mobile station;

a most likely estimator for determining a most likely location estimate of the particular mobile station, said most likely estimator uses one or more location estimates provided by said expert system for determining said most likely location estimate.

26 113. A location system for locating a wireless mobile station that is capable of communicating with a plurality of networked communication stations, comprising:

a transceiver: (a) for at least detecting a direction of wireless signals transmitted from the mobile station, and (b) for communicating with said networked communication stations information related to a location of said wireless mobile station;

a signal analyzer for determining whether a detected wireless signal from said mobile station has been one of: reflected and deflected;

one or more location estimators for providing one or more location estimates of said mobile station by using wireless signals transmitted from said mobile station, wherein at least one of said location estimators utilizes the signals from said mobile station that are determined to be neither reflected nor deflected; and

a transport for moving at least said transceiver when locating said wireless mobile station.

27 114. The location system as claimed in Claim 26 113, wherein said signal analyzer includes a comparator for comparing: (a) a distance of said mobile station from said transceiver using a signal strength of said wireless signals from said mobile station, with (b) a distance of said mobile station from said transceiver using a signal time delay measurement of wireless signal from said mobile station.

Please amend claim 115 as follows:

28 115. (Amended) The location system as claimed in Claim 26 113, further including one or more transceiver location estimators for estimating a location of said transceiver, wherein

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at least one of said transceiver location estimators uses data from wireless signals communicated between: (i) said transport, and (ii) one of: said networked communication stations and a global positioning satellite.

29 116. The location system as claimed in Claim 115, further including a deadreckoning component operatively movable with movements of said transport for estimating a change in a location of said transceiver, wherein said deadreckoning component determines incremental updates to at least one location estimate of said transport output by at least one of said transceiver location estimators.

Please amend claim 117 as follows:

30 117. (Thrice Amended) A method for locating a wireless mobile station, MS, using measurements of wireless signals, wherein at least one of: (i) said measurements, and (ii) said wireless signals are transmitted between the mobile station MS and at least one of a plurality of terrestrial transceivers, wherein said transceivers are capable of at least wirelessly detecting a plurality of wireless transmitting mobile stations, including said mobile station MS, comprising:

providing access to first and second mobile station location estimators, wherein each of said location estimators is capable of providing a location estimate for each mobile station of at least some of said mobile stations when said location estimator is supplied with corresponding data obtained from wireless signal measurements communicated between the mobile station and one or more of said plurality of transceivers;

wherein (a) and (b) following:

(a) said first location estimator determines one or more locations for one of the mobile stations, MS_a, using values that are indicative of a signal time delay between the mobile station MS_a and one or more of the transceivers, said first location estimator determines the one or more locations by performing a triangulation or trilateration, at a location different from that of the mobile station MS_a, and

(b) said second location estimator determines one or more locations for one of the mobile stations MS_b by performing at least one of (b1) through (b3) following;

(b1) an angle of arrival locating technique for estimating one or more angle of arrival locations of the mobile station MS_b, wherein said angle of arrival locating technique determines the angle of arrival locations as being along a direction from which wireless signals arrive at at least one of the transceivers from the mobile station MS_b;

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(b2) a negative logic technique for estimating at least one area where the mobile station MS_b is unlikely to be located;

(b3) a signal processing technique for estimating a location of the mobile station MS_b using wireless signals, S, received by the mobile station MS_b from a plurality of non-terrestrial transmitting stations, wherein said wireless signals S provide time values, and said signal processing technique determines at least one differential between the time values for the wireless signals transmitted by two of the non-terrestrial transmitting stations;

wherein for at least one instance where the first and second location estimators determine respective location estimates for a same location of one of the mobile stations, each of the respective location estimates is substantially unaffected by the other of the respective location estimates;

first supplying said first location estimator with first corresponding data obtained from wireless signal measurements communicated between said mobile station MS and one or more of said plurality of transceivers;

second supplying said second location estimator with second corresponding data obtained from wireless signal measurements communicated between said mobile station MS and one or more of said plurality of transceivers;

first receiving from said first location estimator, first location related information having at least a first one or more locations;

second receiving from said second location estimator, second location related information having at least a second one or more locations;

determining a resulting location estimate of the mobile station MS using at least one of: (a) a first value obtained from said first location related information, and (b) a second value obtained from said second location related information.

Please amend claim 118 as follows:

118. (Thrice Amended) A method for locating a wireless mobile station, comprising:

repeatedly performing the following steps (A1) through (A3) for tracking the mobile station, wherein there is at least a first and a second mobile station location estimator, each of the location estimators able to provide a location estimate of a location of the mobile station at some time during said step of repeatedly performing;

(A1) receiving a location estimate of the mobile station from at least one of the first and a second mobile station location estimators, wherein:

(a) said first location estimator determines a first location estimate of the mobile station when supplied with first data, wherein said first data includes timing values obtained from wireless timing signals received by the mobile station from one or more satellites, wherein the first location estimator determines the first location estimate using a range between the mobile station and at least one of the one or more satellites; and

(b) said second location estimator estimates a second location estimate of the mobile station when supplied with second data, wherein said second location estimator uses values from said second data that are obtained using time delays of wireless signals transmitted between the mobile station and a plurality of terrestrial transceivers cooperatively linked together for use in two way communication with the mobile station, wherein the second location estimator determines the second location by determining one of (i) and (ii) following: (i) a representation of a locus of locations having substantially a same time difference of arrival for wireless signals communicated between: the mobile station, and each of at least two of the transceivers, and (ii) an area having substantially common multipath characteristics, wherein the area is identified by multipath characteristics obtained from wireless signals communicated between the mobile station and the transceivers;

(A2) determining at least one resulting location of said mobile station using at least one of: (a) a first value obtained from an instance of the first location estimate received from said first location estimator, and (b) a second value obtained from an instance of the second location estimate received from said second location estimator;

wherein said step of determining includes a step of determining a likely roadway upon which the mobile station is located;

(A3) outputting said resulting location information for display on a display device, wherein said resulting location information is displayed as at least one location of the mobile station on a map having roadways thereon.

Please amend claim 119 as follows:

~~119~~ 132. (Twice Amended) A method for locating, from a plurality of wireless mobile stations, one of the wireless mobile stations using measurements of wireless signals, wherein at least one of: (i) said measurements and (ii) said wireless signals are transmitted between said one mobile station and at least one of a plurality of fixed location communication stations, each

communication station capable of at least one of receiving wireless signals from, and transmitting wireless signals to said one mobile station, comprising:

receiving, from each of at least first and second mobile station location estimators, corresponding first and second likely geographical approximations for a location of said one mobile station, wherein: (a) for determining a likely geographical approximation, GA_A, for a location, L_A, of a second of the mobile stations at a time T_A, said first location estimator generates GA_A without requiring a prior likely geographical location approximation generated by said second location estimator for locating the second mobile station at substantially the location L_A at substantially the time T_A, and, (b) for estimating a likely geographical approximation, GA_B, for a location, L_B, of a third one of the mobile stations at a time T_B, said second location estimator generates GA_B without requiring a prior likely geographical location approximation generated by said first location estimator for locating the third mobile station at the location L_B at substantially the time T_B;

wherein (A1) and (A2) following hold:

(A1) said first location estimator performs one or more coverage area analysis techniques when said first location estimator is supplied with first data obtained from wireless signal measurements communicated between said one mobile station and one or more of said plurality of the communication stations, wherein each said coverage area analysis technique determines for said one mobile station, at least one of (i) and (ii) following:

(i) an area determined using at least one of (a) and (b) following: (a) for each communication station CS_a of one or more of said communication stations that wirelessly detect said one mobile station, a corresponding area wherein the communication station CS_a is likely to be able to detect said one mobile station, and (b) for each communication station CS_b of one or more of said communication stations that is wirelessly detected by said one mobile station, a corresponding area wherein the communication station CS_b is likely to be detected by said one mobile station, and

(ii) an area determined using at least one of (c) and (d) following: (c) for each communication station CS_c of one or more of said communication stations that can not detect said one mobile station, a corresponding area wherein the communication station CS_c is unlikely to be able to detect said one mobile station, and (d) for each communication station CS_d of one or more of said communication stations that can not be detected by said one mobile station, a

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corresponding area wherein the communication station CS_d is unlikely to be detected by said one mobile station, and

(A2) said second location estimator, when supplied with second data obtained from wireless signal measurements communicated between said one mobile station and one or more of said plurality of communication stations, performs at least one of the location techniques (iii) through (vii) following:

(iii) a pattern recognition technique, wherein said pattern recognition technique estimates a location of said one mobile station by using a comparison of (1) and (2) following: (1) at least one value derived from said second data and (2) one or more values, wherein for each value V of the one or more values, V is derived from mobile station wireless signal measurements at a known location;

(iv) a trainable mobile station location estimating technique for estimating a location of said one mobile station, wherein said trainable mobile station location estimating technique is capable of being trained to associate (3) and (4) following: (3) each location L of a plurality of geographical locations, and (4) corresponding measurements of wireless signals transmitted between some one of the mobile stations and the communication stations, wherein said some mobile station is approximately at the location L;

(v) a locus computing technique for estimating a location of said one mobile station, wherein said locus computing technique utilizes measurements M of wireless signals from said second data between: said one mobile station, and each of two or more of the communication stations for determining at least one locus of locations for said one mobile station, wherein at least one of said measurements M is a function of a signal time delay between said one mobile station and at least one of the two or more communication stations;

(vi) an angle of arrival technique for estimating a location of said one mobile station, wherein said angle of arrival technique determines a location estimate of said one mobile station using a direction from which wireless signals arrive at at least one of the communication stations from said one mobile station;

(vii) a signal processing technique for estimating a location of said one mobile station using wireless signals received by said one mobile station from one or more non-terrestrial transmitting stations, wherein said wireless signals provide time values, and said signal processing technique determines at least one

differential between the time values for the wireless signals transmitted by two of the non-terrestrial transmitting stations;

determining a resulting location estimate of said one mobile station, wherein said step of determining includes at least one of the substeps (B1) through (B3) following:

(B1) combining said first and second likely geographical approximations so that said resulting location estimate is dependent on each of said first and second location likely geographical approximations,

(B2) obtaining one or more rating values for rating said first and second likely geographical approximations, wherein said rating values are indicative of relative expected performances of said first and second location estimators in locating said one mobile station,

(B3) selecting one of said first and second likely geographical approximations for receiving preference in determining said resulting location.

33 120. The method of Claim 119, wherein said one mobile station is part of a mobile base station.

Please amend claim 121 as follows:

34 121. (Thrice Amended) A method for locating a wireless mobile station capable of wireless two way communication with a plurality of fixed location terrestrial stations, comprising:

providing access to a plurality of mobile station location estimators, wherein said location estimators provide location estimates of said mobile station when said location estimators are supplied with corresponding input information upon which their location estimates are dependent, and wherein the corresponding input information is at least partially derived from measurements of wireless signals transmitted from or received at the mobile station;

receiving, over time, a plurality of location estimates of the mobile station, wherein said step of receiving includes steps (a) and (b) following:

(a) first receiving, from a first of said location estimators, a first one or more location estimates of the mobile station, wherein said corresponding input information for said first location estimator includes timing data from wireless signals transmitted from one or more global positioning satellites, and received by the mobile station;

(b) second receiving, from a second of said location estimators, a second one or more location estimates of the mobile station, wherein said corresponding input information for said second location estimator includes data that is a function of a signal time delay of wireless signals transmitted between the wireless mobile station and one of said plurality of fixed location terrestrial stations during a plurality of transmissions between the mobile station and the one terrestrial station wherein there is at least one transmission from the mobile station to the one terrestrial station, and at least one transmission from the one terrestrial station to the mobiles station, and wherein said second one or more location estimates are determined by said second location estimator at a terrestrial site whose location is independent of a movement of the mobile station;

determining, a plurality of consecutive resulting location estimates for tracking the mobile station, wherein said step of determining includes steps (c) and (d) following:

(c) deriving, for at least one time during the tracking, a corresponding one of said resulting location estimates of the mobile station using a most recently obtained one of said first one or more location estimates by said first location estimator, and

(d) deriving, for at least one time during the tracking, a corresponding one of said resulting location estimates of the mobile station using a most recently obtained one of said second one or more location estimates by said second location estimator.

Please amend claim 122 as follows:

122. (Amended) The method as claimed in Claim 121, wherein said step of determining includes:

establishing a priority between a location estimate of said first location estimates and a location estimate of said second location estimates.

123. The method as claimed in Claim 122, wherein said step of establishing includes obtaining a confidence value for one or more of: (a) at least one of said location estimates for said first one or more location estimates; and (b) at least one of said location estimates for said second one or more location estimates;

wherein each said confidence value is indicative of a likelihood of the mobile station having a location represented by said corresponding location estimate for the confidence value.

37 124. The method as claimed in Claim 121, wherein said step of determining includes preferring a location estimate of said first one or more location estimates over a location estimate of said second one or more location estimates when both are available for substantially a same location of the mobile station.

Please amend claim 125 as follows:

38 125. (Amended) The method as claimed in Claim 121, wherein said step of determining includes, for at least one of said resulting location estimates, determining one or more of: (a) a velocity of the mobile station, (b) an acceleration of the mobile station, and (c) one or more features of an area near said at least one resulting location estimate.

Please amend claim 126 as follows:

39 126. (Thrice Amended) A method for providing a location estimate of a wireless mobile station using measurements of wireless signals, comprising:

first transmitting, when available, a first collection of measurements of wireless signals transmitted between said mobile station and one or more satellites, to a first location estimator;

second transmitting, to a second location estimator remote from and independent of a movement of the mobile station, a second collection of measurements obtained from wireless signals transmitted between said mobile station and one or more fixed location terrestrial stations, at least when said first collection is not available, wherein said second collection includes signal time delay data of wireless signals transmitted between the mobile station and the fixed location terrestrial stations;

wherein said second location estimator determines a location estimate of the mobile station by determining a locus of locations from at least one of the fixed location terrestrial stations wherein a signal time delay dependent condition is satisfied using the signal time delay data;

first obtaining a first location estimate of said mobile station when said first location estimator is supplied with an instance of said first collection;

second obtaining a second location estimate of said mobile station when said second location estimator is supplied with an instance of said second collection;

outputting a resulting location estimate that is dependent upon at least one of said first and second location estimates.

Please amend claim 127 as follows:

40 127. (Amended) The method as claimed in Claim 126, further including receiving a signal from the mobile station for determining a location of the mobile station.

Please amend claim 128 as follows:

41 128. (Amended) The method of Claim 126, wherein said step of outputting includes one of more of:

(a) sending said resulting location through a communications network to a known destination;

(b) prioritizing said first and second location estimates when both are available for locating the mobile station at substantially a same time;

(c) combining said first and second location estimates when both are available for locating the mobile station at substantially a same time.

Please amend claim 129 as follows:

42 129. (Amended) The method of Claim 126, wherein said signal time delay dependent condition includes one of a triangulation and a trilateration using one of a time of arrival and a time difference of arrival of wireless signals transmitted between the mobile station and the at least one of the fixed location terrestrial stations.

43 130. (Amended) The method of Claim 126, wherein at least one of said steps of first and second transmitting includes transmitting one of said first and second collections on at least a portion of the Internet.

Please amend claim 131 as follows:

44 131. (Thrice Amended) A method for locating a mobile station using wireless signal measurements obtained from transmissions between said mobile station and a plurality of fixed location communication stations, wherein each of said communications stations includes one or more of a transmitter and a receiver for wirelessly communicating with said mobile station, comprising:

providing access to first and second mobile station location evaluators, wherein said location evaluators are able to determine information related to one or more location estimates of said mobile station when said location evaluators are supplied with data having values obtained

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from wireless signal measurements obtained via transmissions between said mobile station and the communication stations, wherein (A) and (B) following:

(A) said first location evaluator performs one or more of the following techniques (i), (ii) and (iii) when supplied with corresponding instances of said data:

(i) a first technique for determining, for at least one of the communication stations, one of: a wireless signal angle of arrival, and a time difference of arrival between the mobile station and the at least one communication station from two way communications therebetween, wherein the two way communication uses one of: CDMA, TDMA, GSM, NAMPS and AMPS as a communication protocol;

(ii) a second technique for estimating a location of said mobile station, using values from a corresponding instance of said data obtained from signals received at the mobile station from one or more satellites;

(iii) a third technique for identifying a pattern of characteristics of a corresponding instance of said data, wherein said pattern of characteristics is indicative of a plurality of wireless signal transmission paths between the mobile station and each of a plurality of antennas at one or more of the communication stations; and

(B) for the one or more of said techniques performed by said first location evaluator, said second location evaluator performs a different combination of said one or more of said techniques when supplied with corresponding instances of said data for the one or more techniques of said different combination;

first obtaining, from said first location evaluator, first location related information for identifying a location of the mobile station for at least one of the following situations: a tracking of the mobile station, and in response to a request for a location of the mobile station, wherein said first location evaluator uses one or more available first corresponding instances of said data for said one or more techniques performed by said first location evaluator;

second obtaining, from said second location evaluator, second location related information for identifying a location of the mobile station for said same at least one situation when said second location evaluator uses one or more available second corresponding instances of said data for said different combination of said techniques;

determining a resulting location estimate of the mobile station dependent upon at least one of: (a) a first value obtained from said first location related information, and (b) a second value obtained from said second location related information.

Please amend claim 132 as follows:

45 ~~132~~. (Amended) The method as claimed in Claim ~~131~~ 44, wherein said mobile station is co-located with a processor for activating at least one of said location evaluators.

Please amend claim 133 as follows:

46 ~~133~~. (Thrice Amended) A method for locating a mobile station when there is an occurrence of at least one of: said mobile station being tracked, and a request for locating said mobile station, wherein said method uses wireless signal measurements obtained from transmissions between said mobile station and a plurality of fixed location communication stations, wherein each of said communication stations includes one or more of a transmitter and a receiver for wirelessly communicating with said mobile station, comprising:

providing access to first and second mobile station location evaluators, wherein said location evaluators determine information related to one or more location estimates of said mobile station when said location evaluators are supplied with data having values obtained using wireless signals obtained via transmissions between said mobile station and the communication stations, wherein (A) and (B) following:

(A) said first location evaluator performs one or more of the following techniques (i), (ii) and (iii) when supplied with corresponding instances of said data:

(i) a first technique for estimating a location of said mobile station by using a wireless signal angle of arrival between the mobile station and at least one of the communication stations CS, wherein the wireless signal angle of arrival identifies a direction for the mobile station from CS;

(ii) a second technique for estimating a location of said mobile station using values from a corresponding instance of said data obtained from timing signals received at the mobile station from one or more satellites;

(iii) a third technique, wherein said third technique uses a statistical correlation for correlating (a) and (b) following:

(a) wireless signal related values of said corresponding data instance; and

(b) information indicative of a location for the mobile station,

wherein said correlation is used for determining a probability that the mobile station is within at least one geographical area, and

(B) for said one or more of said techniques performed by said first location evaluator, said second location evaluator performs a different combination of said one or more of

said techniques when said second location evaluator is supplied with corresponding instances of data for the one or more techniques of said different combination;

first obtaining from said first location evaluator, first location related information of the mobile station's location for said occurrence using, when available, first corresponding instances of said data for each of said one or more said techniques performed by said first location evaluator;

second obtaining from said second location evaluator, second location related information of the mobile station's location for said occurrence using, when available, second corresponding instances of said data for said different combination;

wherein each of said first and second location related information is capable of being generated substantially independently of the other of said first and second location related information;

determining a resulting location estimate of the mobile station using at least one of (c) and (d) following: (c) a first value obtained from said first location related information, and (d) a second value obtained from said second location related information.

Please amend claim 134 as follows:

134. (Thrice Amended) A method for locating a mobile station using wireless signal measurements obtained from transmissions between said mobile station and a plurality of terrestrial communication stations, wherein each of said communication stations includes one or more of a transmitter and a receiver for wirelessly communicating with said mobile station, comprising:

receiving a location request for a location of the mobile station;

generating one or more estimator requests, for information related to a location of said mobile station, for supplying said one or more estimator requests to one or more mobile station location estimators such that when said location estimators are supplied with corresponding input data having values obtained from wireless signal measurements obtained via transmissions between said mobile station and the communication stations, said one or more location estimators perform at least two of the following techniques (i), (ii), (iii) and (iv):

(i) a first technique for determining, as a result, at least one location estimate or locus for said mobile station by triangulation or trilateration using an instance of said corresponding input data having timing measurements indicative of one of: a time of arrival of wireless signals, and a time difference of arrival of wireless signals between the mobile station and at least one communication station CS, wherein the signals for

obtaining the timing measurements are communicated during a plurality of wireless signal transmissions between the mobile station and CS, with at least one of the transmissions being from the mobile station to CS, and wherein said first technique outputs the result from a site different from the location of the mobile station;

(ii) a second technique for determining one or more candidate locations of the mobile station, wherein each of said candidate locations is determined using, for at least some one of the communication stations CS, an instance of said corresponding input data for a wireless signal angle of arrival that is indicative of a direction of the wireless signal to CS from the mobile station;

wherein for at least one occurrence when both said first and second techniques are used for locating the mobile station at substantially a same location L, (1) and (2) following:

(1) at least one of said candidate locations is substantially unaffected by each said result obtained from every instance of said first technique performed by said location estimators for locating the mobile station at L, and

(2) at least one result from an instance of said first technique is substantially unaffected by each of said candidate locations for locating the mobile station at L;

(iii) a third technique for estimating a location of said mobile station, using timing values from an instance of said corresponding input data obtained from signals received at the mobile station from one or more satellites;

(iv) a fourth technique, wherein said fourth technique provides a pattern recognizer for estimating a location of said mobile station by deriving said location estimate from a pattern of multipath wireless signal characteristics between: (a) one or more of the communication stations, and (b) said mobile station;

first obtaining, from said one or more location estimators, a first one or more location estimates using an available first one or more instances of said corresponding input data;

determining a resulting location estimate of the mobile station obtained from at least one of said first one or more location estimates;

wherein at least one of said steps of receiving, generating, first obtaining, and determining includes a substep of one of: (i) transmitting information to a destination via a communication network, and (ii) receiving information from a source via a communication network.

Please amend claim 135 as follows:

135. (Amended) The method of Claim 134, further including a step of outputting said resulting location estimate to a location identified by said location request.

136. The method of Claim 134, further including requesting that the mobile station raise its wireless signal transmission power prior to the wireless signal measurements being obtained via transmissions between said mobile station and the communication stations.

Please amend claim 137 as follows:

137. (Thrice Amended) A method for locating a mobile station when there is at least one occurrence of: said mobile station being tracked, and a request for locating said mobile station, wherein said method uses wireless signal measurements obtained from transmissions between said mobile station and a plurality of fixed location communication stations, wherein each of said communications stations includes one or more of a transmitter and a receiver for wirelessly communicating with said mobile station, comprising:

providing first and second mobile station location evaluators, wherein each of said location evaluators determine location information having one or more location estimates of said mobile station when said location evaluator is supplied with data having values obtained from wireless signal measurements obtained via transmissions between said mobile station and the communication stations, wherein (A) and (B) following:

(A) said first location evaluator performs one or more of the following techniques (i), (ii), (iii) and (iv) when said techniques are supplied with a corresponding instance of said data:

(i) a first technique for determining a first instance of the location information from a two way communication between the mobile station and at least one of the communication stations CS, wherein one of: a wireless signal angle of arrival, and a time difference of arrival between the mobile station and the at least one communication station is used in determining said first instance, and wherein said first instance is determined remotely from the mobile station;

(ii) a second technique for estimating a location of said mobile station, using timing values from a corresponding instance of said data obtained from signals received at the mobile station from one or more satellites;

(iii) a third technique for recognizing multipath characteristics from a corresponding instance of said data, wherein said third technique includes the steps of (a) and (b) following:

(a) associating, for each of a plurality geographical locations, (a1) and (a2) following: (a1) a representation of the geographical location, and (a2) for the geographical location, corresponding multipath information indicative of multipath signals previously transmitted between some mobile station and the communication stations, when the some mobile station transmitted from approximately the geographical location;

(b) determining one or more likely location estimates for the mobile station from a similarity between (b1) and (b2) following: (b1) multipath characteristics determined from wireless signals communicated between the mobile station and the communication stations, and (b2) the multipath information of (a2) for a collection of one or more of the geographical locations; and

(iv) a fourth technique, wherein said fourth technique statistically determines an expected location of the mobile station by correlating (c) and (d) following:

(c) wireless signal related values obtained from a corresponding instance of said data, and

(d) wireless signal data obtained from a plurality of known geographical locations, and

(B) for said one or more of said techniques performed by said first location evaluator, said second location evaluator performs a different combination of said one or more of said techniques when supplied with corresponding instances of said data for the one or more techniques of said different combination of techniques;

first obtaining, from said first location evaluator, first location related information, for said at least one occurrence, when said one or more corresponding instances are available for said one or more techniques performed by first location evaluator;

second obtaining, from said second location evaluator, second location related information, for said at least one occurrence, when said one or more corresponding instances are available for said one or more techniques performed by second location evaluator;

wherein each of said first and second location related information is capable of being obtained substantially independently from the obtaining of the other of said first and second location related information;

determining a resulting location estimate of the mobile station dependent upon at least one of: (a) a first value obtained from said first location related information, and (b) a second value obtained from said second location related information.

Please amend claim 138 as follows:

138. (Twice Amended) The method of Claim 137, wherein one or more of:

(a) said first technique includes a step of performing one of a triangulation and a trilateration;

(b) said third technique includes a step of activating an artificial neural network;

(c) said fourth technique includes a step of performing one of: a principle decomposition analysis, a least squares analysis, a partial least squares analysis, and a procedure using Bollenger Bands.

Please cancel claim 139.

Please amend claim 140 as follows:

140. (Thrice Amended) A method for locating a mobile station using wireless signal measurements obtained from transmissions between said mobile station and at least one of a plurality of terrestrial transceivers capable of wirelessly detecting said mobile station, comprising:

providing access to one or more of the location techniques (a) through (c) following:

(a) a first technique for triangulating or trilaterating a location of the mobile station, wherein for each transceiver T of three or more of the transceivers, one of: a signal time of arrival, and a signal time difference of arrival between the mobile station and the transceiver T is determined using a first input obtained from the wireless signal measurements, wherein the signals for obtaining the wireless signal measurements are received at the transceiver T during a plurality of wireless signal transmissions between the mobile station and the transceiver T, with at least one of the transmissions being from the mobile station to the transceiver T, and at least one of the transmissions being from the transceiver T to the mobile station;

(b) a second technique using a second input obtained from one or more transmissions between the mobile station and the transceivers, said second input including time delay measurements of signals received at the mobile station from one or more satellites;

(c) a third technique that determines a location of the mobile station by using a plurality of pairs of (i) and (ii) following:

(i) characteristics of wireless multipath signals communicated between some mobile station and one or more of the transceivers, and

(ii) a location of said some mobile station during the communication,

wherein when said third technique is supplied with a third input of characteristics of wireless multipath signals communicated between said mobile station and one or more of the transceivers, data indicative of a location of the mobile station is obtained from a similarity between the third input and the characteristics of wireless multipath signals of (c)(i);

determining whether a particular one of the location techniques (a) through (c) has its corresponding input available for determining a first location estimate of said mobile station;

determining a second location estimate of said mobile station by activating one of said location techniques different from said particular location technique when the corresponding input for said different technique is available.

141. The method as claimed in Claim 140, wherein at least two of said location techniques generate location estimates of said mobile station that do not depend upon one another for their corresponding input to be available.

Please amend claim 142 as follows:

142. (Thrice Amended) A method for locating a mobile station using wireless signal measurements obtained from transmissions between the mobile station and at least one of a plurality of communication stations, wherein each of said communications stations includes one or more of a transmitter and a receiver for wirelessly communicating with the mobile station, comprising:

providing access to at least first and second location estimators for estimating a location of the mobile station, wherein for said first location estimator to estimate a location of the mobile

station, said first estimator is dependent upon a result from a first location technique included in one of the following (a) through (e) location technique categories, and for said second location estimator to estimate a location of the mobile station, said second estimator is dependent upon a result from a second location technique included in a different one of the following (a) through (e) location technique categories:

(a) one of a trilateration and a triangulation technique for determining a location estimate of the mobile station at a site not co-located with the mobile station, wherein for three or more of the communication stations in communication with the mobile station, one of: a wireless signal time of arrival, and a wireless signal time difference of arrival between the mobile station and the three or more communication stations is obtained using a first input obtained from timing measurements of the wireless signal measurements, wherein for at least one of the three or more communication stations, CS, the timing measurements are obtained from signals communicated during a plurality of wireless signal transmissions between the mobile station and CS, with at least one of the transmissions being from the mobile station to CS;

(b) a stochastic technique, wherein said stochastic technique uses a statistical correlation for correlating:

(i) a second input obtained from the wireless signal measurements, and

(ii) data indicative of a location area for the mobile station,

wherein a probability that the mobile station is within the correlated location area is determined from said correlation;

(c) a learning technique, for learning an association, wherein said association is determined by a training process using a plurality of data pairs, each said pair including: first information indicative of a location L of some mobile station, and second information from wireless signal measurements between said some mobile station and one or more of the communication stations when said some mobile station is at the location L,

wherein when said learning technique is supplied with a third input obtained from the wireless signal measurements obtained from transmissions between the mobile station and at least one of a plurality of the communication stations, data indicative of a location for the mobile station is determined;

(d) a pattern recognition location technique for estimating a location of the mobile station by recognizing a pattern of characteristics of a fourth input obtained from the wireless signal measurements, wherein said pattern of characteristics is indicative of multipath wireless signal transmissions between the mobile station and one or more of the communication stations; and

(e) a location technique using a fifth input obtained from measurements from signals received at the mobile station from one or more satellites;

determining whether said first location estimator has its corresponding input available for determining a first location estimate of the mobile station;

determining a second location estimate of said mobile station by activating said second location estimator when the corresponding input for said second location estimator is available, and said corresponding input to said first location estimator is unavailable.

143. The method as claimed in Claim 142, wherein

said first, second, third, and fourth inputs include data related to one or more of: a wireless signal time delay, a wireless signal strength, and a power level of the mobile station; and

said fifth input includes data related to GPS satellite signals.

Please amend claim 144 as follows:

144. (Amended) A method for locating one or more wireless mobile stations using wireless signal measurements obtained from transmissions between said mobile stations and a plurality of communication stations capable of at least one of: wirelessly detecting said mobile stations, and being wirelessly detected by said mobile stations, comprising:

archiving a plurality of data item collections, wherein each said data item collection includes (a1) and (a2):

(a1) a representation of a location of one of said mobile stations,

(a2) a set of measurements obtained from transmissions between one of said mobile stations and at least one of said communication stations, wherein said one mobile station transmits from approximately the corresponding location represented in (a1), and wherein said set of measurements include one or more of (i) and (ii) following:

(i) a signal strength measurement corresponding to a transmission between said one mobile station and one of said communication stations;

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(ii) a signal time delay measurement corresponding to a transmission between said one mobile station and one of said communication stations;

providing a plurality of pattern matching location estimators, wherein at least one of said location estimators uses at least one association between (a1) and (a2) of the archived data item collections when locating one of said mobile stations;

receiving wireless signal data obtained from transmissions between said communication stations and a particular one of said mobile stations at an unknown location, wherein said wireless signal data includes one or more measurements for said set of measurements;

selecting, using a value dependent upon said wireless signal data, one or more of said location estimators;

determining one or more location estimates of said particular mobile station when said selected location estimators are provided with input obtained using said wireless signal data.

145. The method as claimed in Claim 144, wherein said step of selecting includes using a value indicative of an identification of at least one of said communication stations.

146. The method as claimed in Claim 144, wherein said wireless signal data includes information indicative of one of: said particular mobile station being detected by at least one of said communication stations, and said particular mobile station detecting at least one of said communication stations.

147. The method as claimed in Claim 144, wherein said set of measurements further includes one or more of:

a value indicative of a make of said particular mobile station; and

a value indicative of a model of said particular mobile station.

148. The method as claimed in Claim 144, wherein said set of measurements further includes one or more of (a) through (f) following:

(a) a measurement indicative of a current transmission power of said particular mobile station;

(b) a measurement indicative of a maximum transmission power of said particular mobile station;

(c) a measurement indicative of a transmission power level of one of said communication stations;

(d) one or more values indicative of which of said communication stations is on-line and thereby capable of wireless communication with said particular mobile station;

(e) one or more values indicative of which of said communication stations detects a wireless transmission from said particular mobile station; and

(f) one or more values indicative of which of said communication stations is detected by said particular mobile station.

149. The method as claimed in Claim 144, wherein one or more of said pattern matching location estimators includes one of: an artificial neural network, a genetic algorithm, a statistically based pattern recognition system, and an expert system.

150. The method as claimed in Claim 149, wherein said statistically based pattern recognition system includes a regression analysis procedure.

151. The method as claimed in Claim 144, wherein said step of selecting includes evaluating an expert system rule.

Please amend claim 152 as follows:

152. (Twice Amended) A location system for locating one or more wireless mobile stations using wireless signal measurements obtained from transmissions between said mobile stations and a plurality of communication stations capable of at least one of: wirelessly detecting said mobile stations, and being wirelessly detected by said mobile stations, comprising:

an archive for storing a plurality of data item collections, wherein each said data item collection includes (a1) and (a2) following:

(a1) a representation of a location L of one of said mobile stations,

(a2) data indicative of said wireless signal transmissions between said one mobile station and at least one of said communication stations, wherein said one mobile station transmits from approximately the mobile station location L;

a plurality of location estimators, each of at least some of said location estimators: (i) accesses information indicative of at least one correspondence between (a1) and (a2) for a plurality of said data item collections for determining a location estimate of an unknown location of a particular one of said mobile stations, and (ii) uses a corresponding data set indicative of wireless signal transmissions between said particular mobile station at said unknown location, and one or more of said communication stations;

a location estimator selector for selecting one or more of said plurality of location estimators for determining one or more location estimates of said particular mobile station, said selector selects each said location estimator by using information indicative of identifications of one or more communication devices, wherein each said communication device: (i) is one of a wireless signal transmitter and a wireless signal receiver located at one of said communication

stations, and (ii) communicates with said particular mobile station thereby providing at least a portion of said corresponding data set used by said location estimator.

Please amend claim 153 as follows:

153. (Amended) The location system as claimed in Claim 152, wherein, when said location estimator selector selects one of said location estimators that activates an artificial neural network.

154. The location system as claimed in Claim 152, wherein at least one of said communication stations is included in a satellite.

155. The location system as claimed in Claim 152, wherein one of said location estimators includes one of (a) and (b) following:

(a) a pattern recognition capability for estimating a location of said particular mobile station; and

(b) a statistical correlation technique for estimating a location of said particular mobile station;

wherein said one location estimator uses a derived relationship between said sets of wireless signal measurements of said archived data item collections for predicting a location of said particular mobile station.

156. The location system as claimed in Claim 155, wherein one of:

said statistical correlation technique uses one of: principle decomposition, least squares, partial least squares, and Bollenger Bands; and

said pattern recognition capability uses an artificial neural network.

157. The location system as claimed in Claim 156, wherein said artificial neural network includes one of: a multilayer perceptron, an adaptive resonance theory model, and a radial basis function network.

158. The location system as claimed in Claim 152, wherein for selecting at least one of said location estimators, said identifications identify a predetermined plurality of wireless

terrestrial fixed location wireless communication devices, and said corresponding data set for the location estimator includes information indicative of one or more of (a) through (c) following:

(a) whether one of said communication devices is on-line,

(b) whether one of said communication devices detects a wireless transmission from said particular mobile station, and

(c) whether said particular mobile station detects transmissions from one of said communication devices.

Please amend claim 159 as follows:

159. (Thrice Amended) A method for locating a mobile station using wireless signal data obtained from transmissions between said mobile station and a plurality of communication stations capable of at least one of: wirelessly detecting said mobile station, and wirelessly being detected by said mobile station, wherein said communication stations are able to provide voice communication with the mobile station, comprising:

receiving said wireless signal data obtained from transmissions between: (i) said communication stations, and (ii) said mobile station at an unknown location, wherein said wireless signal data includes at least two of (A1) through (A3) following:

(A1) signal timing measurements of wireless signal transmissions between said mobile station and one or more of said communication stations at terrestrial locations, wherein for at least one of the one or more communication stations, CS, there is a corresponding portion of the signal timing measurements that are obtained during a plurality of wireless signal transmissions between the mobile station and CS, with at least one of the transmissions being from the mobile station to CS;

(A2) time delay measurements from wireless signal transmissions from one or more satellites to said mobile station, each of the satellites having one of the communication stations;

(A3) signal pattern characteristics of wireless signal transmissions between said mobile station and one or more of said communication stations, wherein said signal pattern characteristics are indicative of a multipath signal pattern at the unknown location between the mobile station and at least one of the communication stations;

generating one or more location estimates of said mobile station, using said wireless signal data, and at least two of the following location techniques (B1) through (B3) following:

(B1) a triangulation or trilateration technique using the measurements from (A1), said triangulation or trilateration technique performed at a site different from the unknown location of the mobile station;

(B2) a triangulation technique using the measurements from (A2);

(B3) a pattern recognition technique for estimating a location of said mobile station by recognizing a signal pattern of characteristics from (A3).

160. The method as claimed in Claim 159, wherein said step of generating includes performing a stochastic technique for generating a location estimate of said mobile station, wherein said stochastic technique uses a statistical correlation for correlating:

(i) measurements from said wireless signal data, and

(ii) previously obtained wireless signal data indicative of a plurality of known mobile station locations;

wherein said stochastic technique determines a probability that said unknown location is within a geographic area.

Please amend claim 161 as follows:

161. (Amended) The method as claimed in Claim 159, wherein said step of generating includes providing at least one instance of said signal pattern characteristics to a pattern recognizer that is trainable when repeatedly provided with previously obtained wireless signal data indicative of a plurality of known mobile station locations.

162. The method as claimed in Claim 161, wherein said pattern recognizer includes one of: an artificial neural network and a genetic algorithm.

Please amend claim 163 as follows:

163. (Thrice Amended) A mobile station location system, comprising:

an interface to one or more mobile station location estimators for estimating locations of mobile stations, such that for each mobile station MS of at least some of the mobile stations, when said one or more location estimators are supplied with corresponding data obtained from measurements of wireless signals transmitted between the mobile station MS, and at least one of (1) and (2) following:

(1) a plurality of communication stations capable of at least one of: wirelessly detecting said mobile stations, and being wirelessly detected by said mobile stations, and

(2) one or more non-terrestrial wireless signal transmitting stations,

then for said one or more location estimators supplied with their corresponding data, each such estimator outputs a corresponding location estimate of a geographical location of the mobile station MS;

wherein for a first of said mobile station location estimators, when estimating a location of one of the mobile stations, said first estimator is dependent upon a result from a first component included in one of the following (a) through (f) component categories, and for a second of said mobile station location estimators, when estimating a location of one of the mobile stations, said second estimator is dependent upon a result from a second component included in a different one of the following (a) through (f) component categories, wherein for at least one instance of locating one of the mobile stations, said first and second estimators provide different location estimates:

(a) a category of pattern recognition components, wherein each said pattern recognition component estimates a location of one of the mobile stations, MS_a, from a pattern of multipath signal characteristics including a plurality of time delayed signal strengths of wireless signals communicated between MS_a and at least one of the communication stations;

(b) a category of trainable mobile station location estimating components for estimating locations of the mobile stations, wherein each said trainable mobile station location estimating component is capable of being trained to associate: (i) each location, L, of a plurality of geographical locations with (ii) corresponding measurements of wireless signals transmitted between some one of said mobile stations and at least one of the plurality of communication stations, wherein said some mobile station is approximately at the location L;

(c) a category of locus computing components for estimating locations of the mobile stations, each of said locus computing components outputting location estimates for a plurality of different mobile stations,

wherein each of said locus computing components, when estimating a location of one of the mobile stations MS_c, utilizes timing measurements for determining a locus of

locations for MS_c, wherein the timing measurements are from said corresponding data for said locus computing component locating MS_c, and

wherein said timing measurements are a function of a signal time delay between the mobile station MS_c, and at least one of the communication stations CS, said communication station CS being attached to the ground, and

wherein there is a portion of the timing measurements that are obtained during a plurality of wireless signal transmissions between the mobile station MS_c and CS, with at least one of the transmissions being from the mobile station MS_c to CS;

(d) a category of angle of arrival components for estimating locations of the mobile stations, wherein each of said angle of arrival components, when estimating a location of one of the mobile stations MS_d, determines a location estimate of the mobile station MS_d using a direction from which wireless signals arrive at at least one of the communication stations from the mobile station MS_d;

(e) a category of negative logic components, wherein each of said negative logic components, when estimating a location of one of the mobile stations MS_e, determines an area of where the mobile station MS_e is unlikely to be located;

(f) a category of signal processing components, wherein each of said signal processing components, when estimating a location of one of the mobile stations MS_f, uses wireless signals S received at the mobile station MS_f from the non-terrestrial transmitting stations, wherein said wireless signals S provide time values, and said signal processing components determine at least one differential between the time values for the wireless signals S transmitted by a plurality of the non-terrestrial transmitting stations;

wherein said interface includes a component for communicating on a communications network with at least one of said one or more location estimators and thereby receiving, from said at least one estimator, said corresponding location estimate of the mobile station MS; and

a resulting estimator for determining a likely location estimate of the mobile station MS when said resulting estimator receives one or more of said corresponding location estimates for the mobile station MS, said resulting estimator having at least one of: (i) a selector for identifying at least one preferred location estimate from said corresponding location estimates, said likely location estimate being at least as dependent on said at least one preferred location estimate as any other of said one or more corresponding location estimates, and (ii) a combiner for combining said one or more corresponding location estimates for obtaining said likely location estimate.

164. The location system, as claimed in Claim 163, wherein one or more of said mobile station location estimators are capable of being at least one of: added, replaced and deleted by transmissions on a communication network between a portion of said location system and a site remote from said portion.

Please amend claim 165 as follows:

165. (Amended) The location system as claimed in Claim 163, wherein one or more of:

(a) at least one of said one or more corresponding location estimates has a corresponding value therewith indicative of a likelihood that the mobile station MS resides in a geographical area represented by said at least one corresponding location estimate, and said combiner uses said corresponding value for obtaining said likely location estimate; and

(b) said component for communicating on the communications network includes a wireless transceiver for communicating with the plurality of communication stations;

(c) said plurality of communication stations include base stations for wireless communication with said mobile stations;

(d) said non-terrestrial wireless signal transmitting stations include GPS satellites;

(e) said pattern recognition components includes at least one of: an expert system generated by a statistically-based pattern recognition technique, and an artificial neural network;

(f) said trainable mobile station location estimating components includes an artificial neural network.

Please amend claim 166 as follows:

166. (Amended) The location system as claimed in Claim 163, wherein the plurality of communication stations provide communications to a portion of the Internet, and said interface uses a TCP/IP protocol for receiving said corresponding location estimate from said at least one estimator.

Please amend claim 167 as follows:

167. (Amended) The location system as claimed in Claim 163, further including an output gateway for receiving said likely location estimate and obtaining network information related to one or more location receiving applications for transmitting an output, corresponding to said likely location estimate, on one or more communications networks to said one or more location receiving applications.

Please amend claim 168 as follows:

168. (Amended) The location system as claimed in Claim 167, wherein said one or more location receiving applications includes applications for one of: 911 emergency, parolee surveillance, vehicle location, locating related persons, locating animals, providing a person having said mobile station MS with information indicative of his/her location.

Please amend claim 169 as follows:

169. (Thrice Amended) A mobile station location system, comprising:

an interface to a plurality of mobile station location estimators for at least one of (1) and (2) following:

(1) activating said mobile station location estimators; and

(2) receiving one or more location estimates of mobile stations;

wherein for each mobile station MS of at least some of the mobile stations, when one or more of said location estimators are supplied with corresponding data obtained from measurements of wireless signals transmitted between (i) and (ii) following:

(i) the mobile station MS, and

(ii) at least one of: a network of communication stations cooperatively linked for use in locating the mobile stations, and one or more non-terrestrial wireless signal transmitting stations,

then for said one or more location estimators supplied with their corresponding data, each such estimator outputs a corresponding location estimate of a geographical location of the mobile station MS;

wherein for a first of said mobile station location estimators, when estimating a location of one of the mobile stations, said first estimator is dependent upon a result from a first component included in one of the following (a) through (c) component categories, and for a second of said mobile station location estimators, when estimating a location of one of the mobile

stations, said second estimator is dependent upon a result from a second component included in a different one of the following (a) through (c) component categories, wherein for at least one instance of locating one of the mobile stations, said first and second estimators provide different location estimates:

(a) a category of pattern recognition components, wherein each of said pattern recognition components, when estimating a location of one of the mobile stations MS_a, estimates a location of the mobile station MS_a from a pattern of wireless signal characteristics including a plurality of time delayed signal strengths of the wireless signal measurements;

(b) a category of triangulation components, wherein each of said triangulation components, estimates locations of each mobile station MS_b of a plurality of different ones of the mobile stations, wherein each said triangulation component utilizes timing measurements of wireless signals between the mobile station MS_b and three of the communication stations for determining a location estimate of the mobile station MS_b,

wherein said timing measurements are a function of a signal time delay between the mobile station MS_b, and at least one communication station CS of the three communication stations,

wherein said communication station CS is attached to the ground, and

wherein there is a portion of the timing measurements that is obtained during a plurality of wireless signal transmissions between the mobile station MS_b and CS, with at least one of the transmissions being from the mobile station MS_b to CS;

(c) a category of signal processing components, wherein each of said signal processing components, when estimating a location of one of the mobile stations MS_c, uses wireless signals S received at the mobile station MS_c from the non-terrestrial transmitting stations, wherein said wireless signals S provide time values, and said signal processing components determine at least one differential between the time values for the wireless signals transmitted by a plurality of the non-terrestrial transmitting stations;

wherein said interface includes a component for communicating on a communications network with at least one of said first and second estimators for thereby at least one of (3) and (4) following:

(3) requesting activation of said at least one estimator, and

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(4) receiving, from said at least one estimator, said corresponding location estimate of the mobile station MS; and

at least one of (5) and (6) following:

(5) an activation requester that determines which of at least one of the first and second location estimators to request activation via said interface for locating the mobile station MS, and

(6) a resulting estimator for determining a likely location estimate of the mobile station MS when said resulting estimator receives one or more of said corresponding location estimates for the mobile station MS, wherein said resulting estimator includes at least one of: (i) a selector for selecting at least one preferred location estimate from said corresponding location estimates, said likely location estimate being at least as dependent on said at least one preferred location estimate as any other of said corresponding location estimates, and (ii) a combiner for obtaining said likely location estimate as a function of two or more of said corresponding location estimates when two or more of said corresponding location estimates for MS are available.

Please amend claim 170 as follows:

170. (Amended) The mobile station location system of Claim 169, wherein said network communications are transmitted by at least one of: (a) wirelessly, (b) via a portion of the Internet, and (c) the network of communication stations.

Please amend claim 171 as follows:

171. (Amended) The mobile station location system of Claim 169, further including a data identifier for determining, for at least one of said mobile station location estimators LE, whether its said corresponding data is available so that said at least one mobile station estimator LE is able to generate its said corresponding location estimate.

Please amend claim 172 as follows:

172. (Amended) The mobile station location system of Claim 169, further including at least one data base having performance information indicative of a performance of at least one of said mobile station location estimators LE in providing previous location estimates of the mobile stations, wherein said performance information is used for determining a measurement

of a likelihood of the mobile station MS being in a geographical location represented by a location estimate output by LE.

Please amend claim 173 as follows:

85 173. (Amended) The mobile station location system of Claim 169, further including a controller for receiving information indicative of a type of wireless signal measurements for locating the mobile station MS, and subsequently using said information for requesting activation of one of said mobile station location estimators.

Please amend claim 174 as follows:

86 174. (Thrice Amended) A method for locating a mobile station, comprising:

providing access to a plurality of mobile station location estimators for estimating locations of mobile stations, such that for each mobile station MS of at least some of the mobile stations, when one or more of said location estimators are supplied with corresponding data obtained from measurements of wireless signals transmitted between:

(i) the mobile station MS, and

(ii) at least one of: (1) a network of communication stations cooperatively linked for use in locating the mobile stations, and (2) one or more non-terrestrial wireless signal transmitting stations,

then said one or more location estimators output one or more location estimates of a geographical location of the mobile station MS;

receiving a request for locating the mobile station MS;

first obtaining, from a first of said mobile station location estimators, a first location estimate of the mobile station MS when said corresponding data for said first estimator is input to said first estimator, said first estimator being dependent upon a result from a first component included in one of the component categories (a) through (e) following the step of second obtaining;

second obtaining from a second of said mobile station location estimators, a second location estimate of the mobile station MS when said corresponding data for said second estimator is input to said second estimator, said second estimator being dependent upon a result from a second component included in one of the component categories (a) through (e) following that is different from said component category having said first component, wherein for at least

one instance of locating one of the mobile stations, said first and second estimators provide different location estimates:

(a) a category of pattern recognition components, wherein each said pattern recognition component estimates a location of one of the mobile stations, MS_a, from a pattern of multipath signal characteristics including a plurality of time delayed signal strengths of wireless signals communicated between MS_a and the network of communication stations;

(b) a category of trainable mobile station location estimating components, wherein each of said trainable mobile station location estimating components estimates a location of one of the mobile stations MS_b by being trained to associate: (i) each location L of a plurality of geographical locations with (ii) corresponding measurements of wireless signals transmitted between some one of said mobile stations and the network of communication stations, wherein said some mobile station is approximately at the location L;

(c) a category of triangulation components, wherein each of said triangulation components estimates a location of one of the mobile stations, MS_c, at a site remotely located from the mobile station MS_c,

wherein each of said triangulation components outputs location estimates for a plurality of different ones of the mobile stations,

wherein each of said triangulation components utilize timing measurements of wireless signals between the mobile station MS_c and three of the communication stations for determining a location estimate of the mobile station MS_c,

wherein said timing measurements are a function of a signal time delay between the mobile station MS_c and at least one communication station CS of the three communication stations, said communication station CS being attached to the ground, and wherein there is a corresponding portion of the signal timing measurements that are obtained during a plurality of wireless signal transmissions between the mobile station MS_c and CS, with at least one of the transmissions being from the mobile station MS_c to CS;

(d) a category of angle of arrival components wherein each of said angle of arrival components estimates a location of one of the mobile stations, MS_d, by determining a location estimate of the mobile station using a direction from which wireless signals arrive at at least one of the communication stations from the mobile station;

(e) a category of signal processing components wherein each of said signal processing components estimates a location of one of the mobile stations, MS_e, using wireless signals received at the mobile station MS_e from the non-terrestrial transmitting stations, wherein said wireless signals provide time values, and said signal processing components determine at least one differential between the time values for the wireless signals transmitted by two of the non-terrestrial transmitting stations;

generating a resulting location estimate of the mobile station MS, said resulting location estimate being dependent upon an estimate of the mobile station MS from at least one of said first and second mobile station location estimators when said corresponding data for said at least one of the first and second estimators is input to said at least one of the first and second estimators;

wherein said step of generating includes at least one of the substeps (i) and (ii) following: (i) identifying at least one preferred location estimate from said first and second location estimates, said resulting location estimate being at least as dependent on said preferred location estimate as any other of said corresponding location estimates obtained, and (ii) combining said first and second location estimates for obtaining said resulting location estimate.

87 ~~175~~. The method of Claim ~~174~~, wherein said step of receiving includes receiving a communication related to one of: a location of a vehicle via the Internet, and a location of a 911 caller.

88 ~~176~~. The method of Claim ~~174~~, further including a step of requesting activation of at least one of said first and second mobile station location estimators via a communication on one of: the Internet and a telephony network.

Please amend claim 177 as follows:

89 ~~177~~. (Amended) The method of Claim ~~174~~, further including a step of outputting information indicative of said resulting location estimate, wherein said information includes data providing a likelihood that the mobile station MS is located within a geographic area represented by said resulting location estimate.

Please amend claim 178 as follows:

90 ~~178~~. (Amended) The method of Claim ~~174~~, further including a step outputting said resulting location to a predetermined destination on a communications network for one of:

surveilling a parolee, locating an animal, locating a person related to a person initiating the request, providing a caller with his/her location, routing a vehicle, and used for keeping at least two entities apart.

Please amend claim 179 as follows:

91 179. (Twice Amended) A method for locating a wireless mobile station, comprising:

repeatedly performing the following steps (A1) through (A3) for tracking the mobile station;

(A1) receiving a location estimate of the mobile station said location estimate obtained from using at least one of (a) and (b) following:

(a) first data obtained from wireless timing signals received by the mobile station from one or more satellites, wherein said timing signals from each of the one or more satellites identify a locus of locations of the mobile station; and

(b) second data obtained from time delays of wireless signals transmitted between the mobile station and one or more transceivers of a plurality of transceivers cooperatively linked together for use in locating the mobile station, wherein said time delays identify a locus of locations of the mobile station from at least one of the transceivers, and wherein for one of the one or more transceivers, the time delays are obtained from signals transmitted during a plurality of wireless signal transmissions between the mobile station and the one transceiver, with at least one of the transmissions being from the mobile station to the one transceiver;

wherein an instance of each of (a) and (b) is used at some time during the tracking of the mobile station for determining a respective location of the mobile station;

(A2) determining a likely location of the mobile station by determining a likely roadway upon which the mobile station is located;

(A3) providing information indicative of said likely location information for displaying on a display device.

Please amend claim 180 as follows:

92 180. (Amended) The method of Claim 85, wherein for at least said mobile station MS, said manner by which said first and second estimators determine said first and second likely geographical ranges is such that said first and second likely geographical ranges are determined independently of one another.

93 182. The method of Claim 85, wherein said at least one communication station transmits a first wireless signal to the MS and receives in response to said first wireless signal, a

responsive signal from the MS, and any intermediary devices for transmitting signals between said MS and the communication stations are terrestrial.

183. The method of Claim 182, wherein said plurality of communication stations includes at least some communication stations that are able to provide voice communication between the mobile station MS and another party, wherein the communication travels through a public switched telephone network, and the mobile station is hand-held.

184. The method of Claim 183, wherein said communication between the mobile station MS and the another party uses one of the following wireless transmission techniques: CDMA, TDMA, GSM, AMPS, and NAMPS.

185. The method of Claim 85, further including providing a wireless transmission to a second mobile station, wherein said second mobile is capable of moving toward the mobile station MS.

Please amend claim 186 as follows:

186. (Amended) The method of Claim 85, wherein said angulation technique determines both (a) and (b) following: (a) said distance between a first instance of the at least one communication station CS and the MS, and (b) said wireless signal angle-of-arrival between the MS and a second instance of the at least one communication station CS.

Please amend claim 187 as follows:

187. (Amended) The method of Claim 97, wherein said one or more location evaluators perform at least three of the techniques (i), (ii) and (iii) in said step of obtaining.

Please amend claim 188 as follows:

188. (Amended) The method of Claim 97, wherein said mobile station MS includes a mobile telephone that communicates with at least some of said communication stations using one of the following wireless transmission techniques: CDMA, TDMA, GSM, AMPS, and NAMPS.

Please cancel claim 189.

Please amend claim 190 as follows:

190. (Amended) The method of Claim 89 further including a step of receiving said input data from a commercial mobile radio service provider (CMRS).

191. The method of Claim 89, wherein said third technique uses a time difference of arrival of wireless signals transmitted between the mobile station MS3 and the communication station CS for determining a locus of points having a hyperbolic shape.

192. The method of Claim 89, wherein the communication station CS transmits a first wireless signal to the MS3 and receives in response to said first wireless signal, a responsive signal from the MS3, and any intermediary devices for transmitting signals between the MS3 and the communication stations are terrestrial.

193. The method of Claim 89, wherein said step of first transmitting includes responding to an Internet request to locate the first mobile station.

194. The method of Claim 193, wherein the first mobile station is a moving vehicle.

195. The method of Claim 97, wherein said third technique includes performing one of: a least squares process, partial least squares process, and a principle decomposition process.

196. The method of Claim 85, further including a step of requesting the mobile station MS to raise its transmission power level.

197. The location system of Claim 100, wherein said location determiner includes a snap to route module, wherein said resulting location information of said mobile station MS identifies a vehicle route near an intermediate location determined using said likely geographical location LE.

Please amend claim 198 as follows:

198. (Amended) The method of Claim 100 further including a step of transmitting said resulting location estimate via one of the Internet and a telephony network.

199. The method of Claim 88 further including a step of transmitting said resulting location estimate via one of the Internet and a public switched telephone network.

Please amend claim 200 as follows:

200. (Amended) The method of Claim 97, wherein said step of transmitting includes transmitting said resulting information via one of the Internet and a network supporting voice communication.

201. The method of Claim 101 further including a step of transmitting said further location estimate via one of the Internet and a public switched telephone network.

Please amend claim 202 as follows:

202. (Amended) The method of Claim 106, wherein at least one of said adaptable location estimators adapts by one of:

learning an association for associating, for each of at least some of said data collections, said geographical location representation (a1) of the data collection with said set of said wireless signal measurements (a2) of the data collection; and

determining a statistical similarity between (b1) and (b2) following: (b1) wireless signal measurements obtained from transmissions between said mobile station MS and the network, and (b2) said wireless signal measurements (a2) of the data collections in said archive.

Please amend claim 245 as follows:

245. (Amended) The method of Claim 117, wherein the step of determining a resulting location includes performing a third technique for determining a likely location of the mobile station MS, wherein (c) - (e) following hold:

(c) the third technique is dependent upon multipath data, wherein the multipath data is obtained from wireless signal multipath information communicated between the mobile station MS and the transceivers,

(d) the third technique is dependent upon (d1) and (d2) following: (d1) a representation of each of a plurality of geographical locations, and (d2) for each of the geographical locations, corresponding multipath information previously obtained using transmissions between some mobile station and the transceivers, when the some mobile station transmitted from approximately the geographical location,

(e) the third technique determines one or more of the geographical location representations that are likely to be approximate to at least one location of the mobile station MS.

Please cancel claim 246.

Please amend claim 247 as follows:

247. (Amended) The method of Claim 121, wherein said two way communication between the mobile station and the terrestrial stations uses one of: CDMA, TDMA, GSM, and NAMPS.

Please amend claim 248 as follows:

248. (Amended) The method of Claim 123, further including a step of:

providing communication between the mobile station and another party via at least one of the communication stations, wherein the communication travels through a network that supports voice communication.

Please amend claim 249 as follows:

249. (Amended) The method of Claim 127, further including the steps of:

providing communication between the mobile station and another party via at least one of the communication stations, wherein the communication travels through a public switched telephone network;

requesting one or more of the location estimates in response to signals received from a commercial mobile radio service provider wirelessly communicating with the mobile station;

transmitting, via at least one of a public switched telephone network and the Internet, at least one location of the mobile station to one of: a public safety answering point, a police unit, and a party requesting the location of the mobile station.

Please cancel claim 250.

Please enter the following new claims.

251. (New) The method of Claim 85, wherein at least one of said first and second location estimators utilize a technique for estimating a location of said mobile station MS using values

from said corresponding input data obtained from timing signals received at the mobile station MS from one or more non-terrestrial communication stations.

252 (New) The method of Claim 190, wherein for said third technique, the at least one communication station CS is one of: included in, and co-located with a base station of said CMRS, wherein CS is in two way communication with the mobile station MS3.

253. (New) The method of Claim 97, wherein at least one of said second and third techniques includes a step of second determining a likely geographical location of the mobile station MS, wherein one or more of (d1) - (d3) following hold:

(d1) the step of second determining is dependent upon multipath data of the corresponding input data, wherein the multipath data is obtained from wireless signal multipath information communicated between the mobile station MS and the communication stations,

(d2) the step of second determining is dependent upon (i) and (ii) following: (i) a representation of each of a plurality of geographical locations and (ii) for each of the geographical locations, corresponding multipath information previously obtained using transmissions between some mobile station and the communication stations, when the some mobile station transmitted from approximately the geographical location,

(d3) the step of second determining includes a step of selecting one or more of the geographical location representations that are likely to be approximate to the unknown location.

254. (New) The method of Claim 101, wherein said step of additionally obtaining includes determining that said additional location estimates satisfy a predetermined constraint dependent on said initial location estimate.

255. (New) The location system of Claim 103, wherein for each occurrence of at least a majority of occurrences of locating one or more mobile stations, said first location estimator and said one location estimator output location estimates that are effectively substantially representing a same location.

256. (New) The location system of Claim 103, wherein said output gateway includes an interface to one of: the Internet and a telephony network.

257. (New) The location system, as claimed in Claim 103, wherein said location estimate adjuster includes a statistical simulation module for deriving one or more likelihood values indicative of said additional location estimate representing the geographical location of MS.

258. (New) The location system of Claim 106, further including:

a network interface for receiving a requests for locating, at one or more locations, the mobile station MS; and

an output gateway for transmitting, to a destination, a resulting location estimate for the mobile station MS, wherein said resulting location estimate is dependent upon one or more location estimates determined by a selected one of said plurality of location estimators.

259. (New) The location system of Claim 106, wherein the one or more adaptable location estimators include at least one of the following techniques (a) and (b):

(a) a first technique for determining a likely location of the mobile station MS, wherein (a1) - (a3) following hold:

(a1) the first technique is dependent upon multipath data, wherein the multipath data is obtained from wireless signal multipath information communicated between the mobile station MS and the communication stations,

(a2) the first technique is dependent upon (i) and (ii) following: (i) a representation of each location L_a of a plurality of geographical locations and (ii) for each of the geographical locations L_a, corresponding multipath information previously obtained using transmissions between some mobile station and the communication stations, when the some mobile station transmitted from approximately the geographical location,

(a3) the first technique determines one or more of the geographical location representations that are likely to be approximate to the mobile station MS;

(b) a second technique for determining a likely location of the mobile station MS, wherein said second technique includes the steps of (b1) and (b2) following:

(b1) calibrating, for each location L_b of a plurality geographical locations, (i) and (ii) following: (i) a representation of the geographical location L_b with

(ii) corresponding multipath information indicative of multipath signals previously transmitted between some mobile station and the communication stations, when the some mobile station transmitted from approximately the geographical location L_b;

(b2) determining one or more likely location estimates for MS by identifying a similarity between (iii) and (iv) following: (iii) multipath characteristics determined from wireless signals communicated between the mobile station MS and the communication stations, and (iv) the multipath information of (b1)(ii) for a collection of one or more of the geographical locations.

260. (New) The location system as claimed in Claim 106, wherein said one or more adaptable location estimators includes first and second adaptable location estimators, wherein each of first and second location estimators includes, respectively, a first and second artificial neural network, and said second artificial neural network is different from said first artificial neural network.

261. (New) The method of Claim 117, further including a step of transmitting said resulting location estimate on a communication network.

262. (New) The method of Claim 118, wherein for a first performance of the steps (A1) through (A3), an instantiation of the first value is used in determining a first instance of said at least one resulting location, and for a second performance of the steps (A1) through (A3), an instantiation of the second value is used in determining a second instance of said at least one resulting location.

263. (New) The method of Claim 118, wherein at least one occurrence of said step of outputting includes transmitting said resulting location information via a telephony network.

264. (New) The method of Claim 119, further including a step of outputting said resulting location estimate to a destination accessible via a communications network.

265. (New) The method of Claim 264, wherein said destination is the one mobile station.

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266. (New) The method of Claim 121, further including a step of:

providing communication between the mobile station and another party via at least one of the terrestrial stations, wherein the communication travels through a telephony network.

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267. (New) The method of Claim 121, further including the steps of:

requesting one or more of the location estimates via signals transmitted by a commercial mobile radio service provider that wirelessly communicates with the mobile station;

transmitting, via a communication network, at least one location of the mobile station to one of: the mobile station, another mobile station, a police unit, a vehicle, and a party requesting the location of the mobile station.

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268. (New) The method of Claim 126, further including communicating with an emergency response center during an occurrence of an emergency request in which said resulting location estimate is used.

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269. (New) The method of Claim 131, further including a step of transmitting said resulting location estimate on a communications network to a destination requesting the location of the mobile station.

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270. (New) The method of Claim 133, wherein said step of determining includes a step of identifying one or more subareas for said resulting location, said one or more subareas selected from a predetermined plurality of subareas of a larger mapped area.

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271. (New) The method of Claim 133, further including requesting one or more of the first and second location related information in response to signals received from a commercial mobile radio service provider wirelessly communicating with the mobile station.

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272. (New) The method of Claim 133, further including transmitting, via a communication network, at least one location of the mobile station to one of: the mobile station, a public safety answering point, a police unit, and a party requesting the location of the mobile station.